A.D. 1868, 3rd MARCH. N° 718.

SPECIFICATION

OF

JOHN BARKER.

CONSUMING SMOKE IN FURNACES, &c.

LONDON:
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A.D. 1868, 3rd MARCH. N° 718.

Consuming Smoke in Furnaces, &c.

LETTERS PATENT to John Barker, of Todmorden, in the County of York, for the Invention of "CERTAIN IMPROVEMENTS IN THE METHOD OF CONSUMING SMOKE FROM THE FUEL USED IN FURNACES, AND IN THE METHOD OF SUPPLYING FUEL TO FURNACES, AND IN APPARATUS CONNECTED THEREWITH."

Sealed the 28th August 1868, and dated the 3rd March 1868.

PROVISIONAL SPECIFICATION left by the said John Barker at the Office of the Commissioners of Patents, with his Petition, on the 3rd March 1868.

I, JOHN BARKER, of Todmorden, in the County of York, do hereby declare the nature of the said Invention for "CERTAIN IMPROVEMENTS IN THE METHOD OF CONSUMING SMOKE FROM THE FUEL USED IN FURNACES, AND IN THE METHOD OF SUPPLYING FUEL TO FURNACES, AND IN APPARATUS CONNECTED THEREWITH," to be as follows:—

My Invention is designed for consuming the gaseous and carbonaceous portions of smoke emanating from the fuel used in furnaces.

Barker's Improvements in Consuming Smoke in Furnaces, &c.

The first part of my improvements consists in the application of jets or flames of gas or other equivalent to ignite the gas, which is abundantly contained in the smoke after it has passed along the flue and is passing to the chimney; for which purpose I apply one or more gas supply pipes in the space behind the flues, or in the flues if desired, and provide burners in such pipes in such a position that the draught from the furnace will not extinguish them, which is accomplished by placing them in the opposite side of the pipe to the draught, so that the back part of the pipe protects the gas flames. When gas is admitted to these tubes and ignited such gas flames are surrounded by the gas and smoke from the furnace, and the said gas becomes ignited by the jets and the combination extends and is maintained the whole length of the flue, which also consumes the carbon in the smoke.

Secondly. The Invention relates to a self-acting feeding apparatus to supply fuel to the furnace, which when in action constantly supplies and disperses the coal over the whole surface of the furnace or fire. The improvements consist in applying to the front or mouth of the furnace a revolving wheel containing a number of blades, beaters, or shovels mounted on arms radiating from the central boss, the shovels or beaters being placed upon their supporting arms at different angles, and above these "beaters" or "throwers" a pair of adjustable fluted rollers are supported in the lower part of the frame of a coal or fuel "hopper" which extends some distance above such rollers, the said beaters and rollers being enclosed in a suitable chamber excluding the outer atmosphere and the rollers above the beaters receive a slow revolving motion by means of worms, worm wheel and bevil gearing, and the beaters are driven at a greater velocity by means of positive or frictional gearing. The "hopper" above the fluted rollers when filled with fuel supplies it gradually on to the fluted rollers, and as they slowly revolve thus break the larger portions into suitable sizes which fall on to the quickly revolving "beaters," and by their peculiar construction or arrangement the fuel is thrown as they fall over the whole surface of the furnace grate, thereby effecting a more perfect combustion of the fuel, and the accumulation of "slag" is prevented.

Barker's Improvements in Consuming Smoke in Furnaces, &c.

SPECIFICATION in pursuance of the conditions of the Letters Patent filed by the said John Barker in the Great Seal Patent Office on the 2nd September 1868.

TO ALL TO WHOM THESE PRESENTS SHALL COME, JOHN BARKER, of Todmorden, in the County of York, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Third day of March, in the year of our Lord One thousand eight hundred and sixty-eight, in the thirty-first year of Her reign, did, for Herself, Her heirs, and successors, give and grant unto me, the said John Barker, Her special license, that I, the said John Barker, my executors, administrators, and assigns, or such others as I, the said John Barker, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time, and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "CERTAIN IMPROVEMENTS IN THE METHOD OF CONSUMING SMOKE, AND IN THE APPARATUS CONNECTED THEREWITH," upon the condition (amongst others) that I, the said John Barker, my executors or administrators, by an instrument in writing under my hand and seal, or their or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said John Barker, do hereby declare the nature of the said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement and accompanying Drawings, that is to say:—

My Invention is designed for the purpose of economizing the consumption of fuel, and also the prevention of smoke in boilers employed for generating steam; and consists, first, in the novel construction and adaptation to the front of the furnace of an arrangement of apparatus that will, when in motion, gradually and constantly disperse over the whole surface of the furnace an even layer of coal in such a manner

that the fire or heat of the furnace is kept at one even temperature and the formation of slag is prevented. This part of my improvement may be described as follows:—Firmly secured to the front of the furnace, so as to form a portion of the door, is a circular casing in which is supported a shaft having arms radiating from it, and on the ends of which are secured plates of metal placed at different angles, and which are designed and constructed to act as throwers or shovels for discharging or throwing coals so as to disperse them evenly over the whole surface of the grate. The coals or fuel are placed in an hopper above and are caused gradually to fall by means of slowly revolving fluted feed rollers on to these shovels (which are caused quickly to revolve by suitable gearing) from whence they are regularly and evenly pitched or thrown on to the furnace.

The second part of my Invention consists in placing in the boiler flue, immediately behind the boiler, a hollow concave dish in which are placed a number of gas burners which when ignited are protected from becoming extinguished by the sides of the concave dish, containing the unconsumed gas evolved from the fuel when passing over these burners become ignited and consumed, thereby preventing the formation of smoke in the flue, by which means also a higher temperature of heat is created which rarifies the air and consequently increases the draft of the flue.

In order that the Invention may be better understood and explained in detail I have hereunto attached a Sheet of Drawings made on a scale of one and a half inch = one foot.

Fig. 1 represents a front elevation of the improved fuel feeder apparatus applied to the front of an ordinary steam boiler.

Fig. 2 represents a longitudinal section of the boiler and self-feeding apparatus, and also the position and arrangement of gas burners behind the boiler for consuming the smoke evolved from the coals.

In these Figures *a*, *a*, is the boiler; *b*, the furnace; and *c*, the flue, all being well-known parts of the boiler. To the door or front of the furnace *b* a circular casing *d* is secured, in which is enclosed and supported the beaters, throwers, or revolving shovels *e*, which are actuated so as to revolve at a high velocity by means of the gearing *f*; placed above these revolving shovels or throwers an "hopper" or receptacle *g* for coal is secured, the lower portion *h* of which just above

the beaters contains two fluted rollers *i* which are caused slowly to revolve by means of the worm wheel and gearing *k*. The beaters or revolving shovels *e* are supported or fixed at different angles or positions upon the arms of the wheel to which they are secured for the purpose when revolving of throwing the fuel upon the fire, so as equally to distribute the same over the whole surface. At the extremity of the boiler flue a concave or hollow cup *m* is supported, the interior of which is supplied with burners to which gas is supplied from a meter or otherwise, the sides of the cup *m* at the bottom being perforated for the purpose of supplying air to the flame, the said flame being shielded from the draft by the sides of the cup.

The action of the improvements from the foregoing lettered description and Drawings will readily be understood.

Coal or fuel when first fed into the hopper *g* rests upon the feed rollers *i*, from whence when such rollers are slowly revolving are delivered in a regular fall upon the surfaces of the quickly revolving beaters *e*, from whence by the peculiar disposition of such beaters are thrown or pitched over the whole surface of the furnace grate *b*, the quantity so delivered being regulated by the speed of the feed rollers *i*, *i*. The coal by being thus equally and regularly fed into the furnace becomes thoroughly consumed, in the process of which the regular amount of heat emited gives the best result for economy in the generation of steam. The smoke evolved from the fuel when escaping into the flue is arrested in its progress so as to be thoroughly consumed by the flame of gas burning in the cup *m*. By the employment and use of the improved self-fuel feeder and distributer in combination with the gas smoke consumer the fuel is materially economized and smoke is thoroughly prevented escaping from the boiler.

Having now described the nature of my said Invention, together with the method of carrying the same into practical effect, I want it to be distinctly understood in conclusion that I claim,—

First. The novel employment, adaptation, and use of regularly feeding the furnaces of steam boilers with fuel by means of revolving shovels in connection with the mechanism herein-before described, or any slight modification thereof.

And, secondly. I claim the novel employment and use of gas burners situated in the flues of boilers for the purpose of consuming smoke,

together with the general arrangement of mechanism constituting these improvements, as herein-before described and fully set forth in the Drawings attached.

In witness whereof, I, the said John Barker, have hereunto set my hand and seal, this Twenty-sixth day of August, in the year of our Lord One thousand eight hundred and sixty-eight.

JOHN BARKER. (L.S.)

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BARKER'S Specification.

(1 SHEET)

FIG. 1.

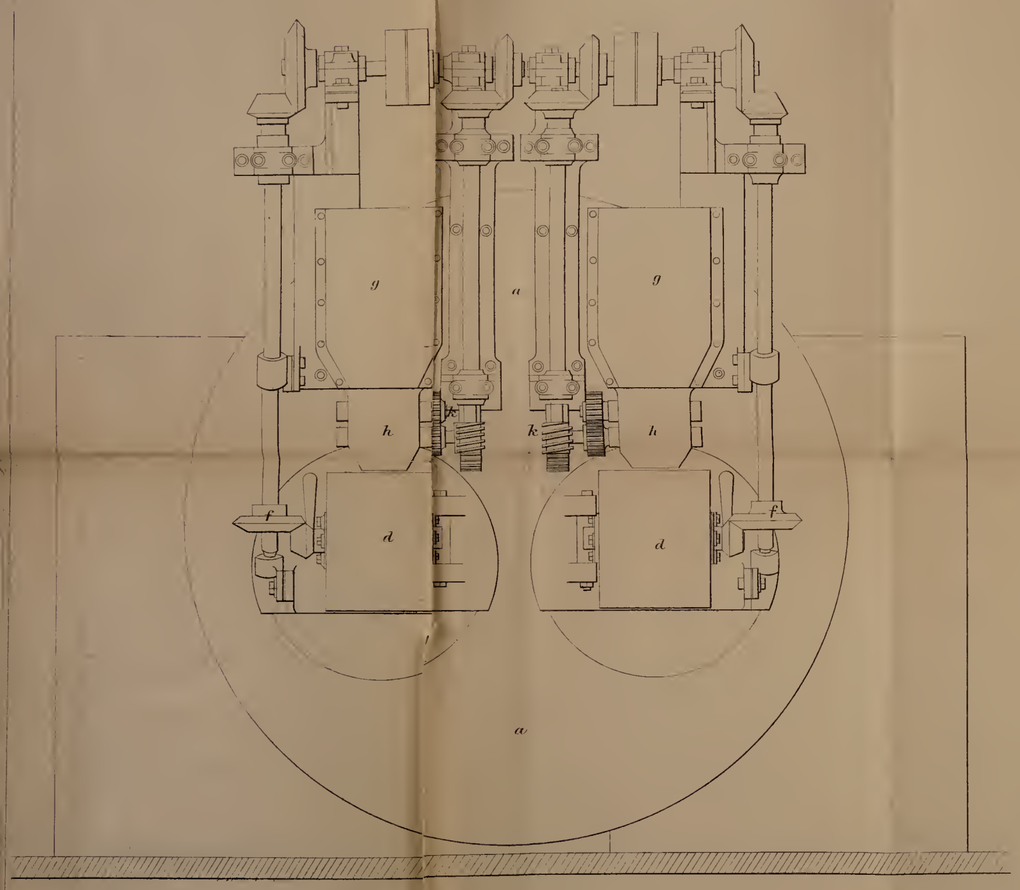
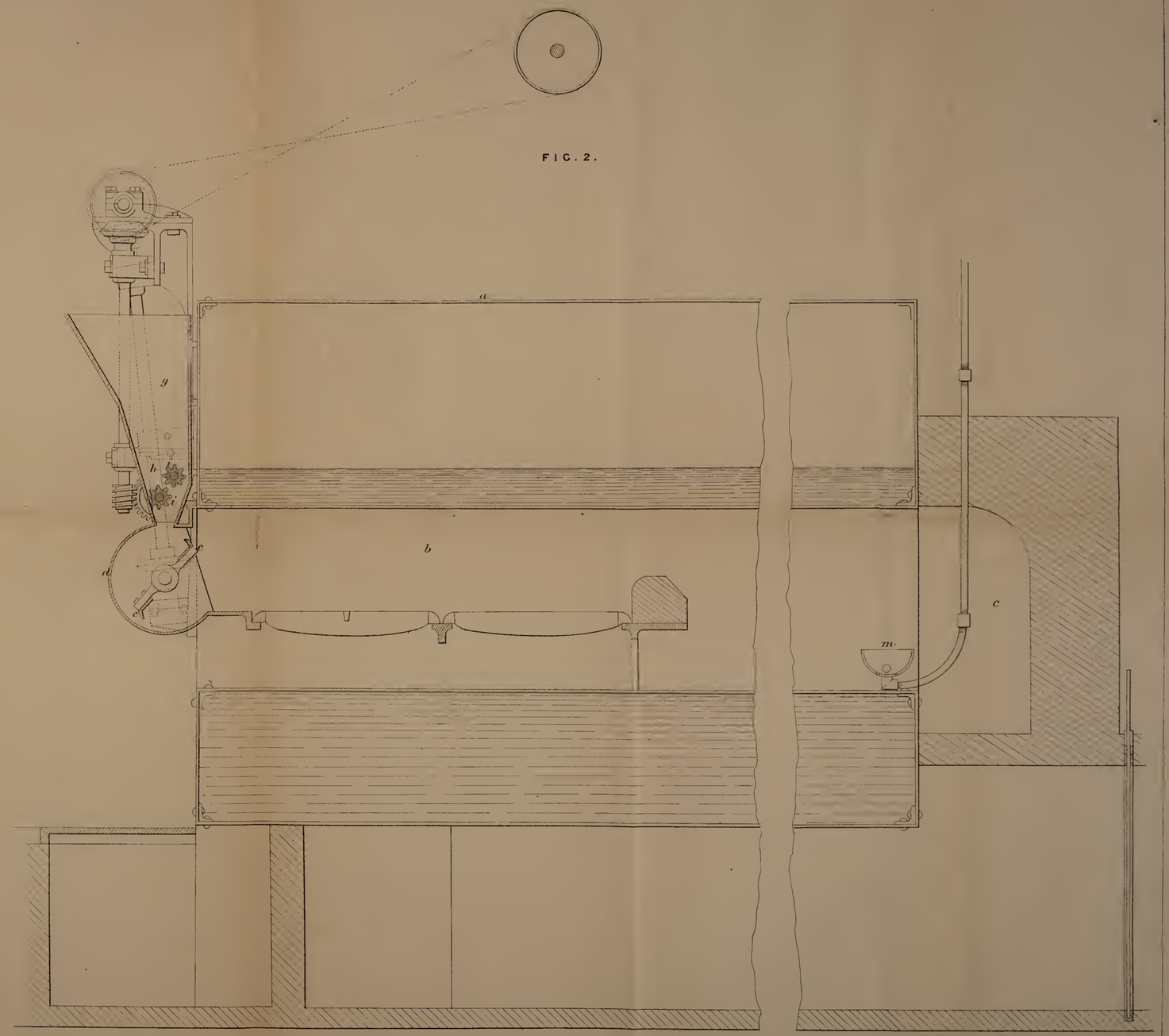


FIG. 2.



The tiled drawing is partly colored.

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